

Dr. Charles F. Brooks,
Secretary, American Meteorological Society
discusses:

LIGHTNING

The phenomenon of lightning, most impressive of all electrical manifestations, long remained without satisfactory explanation. Only comparatively recently has science, with the aid of delicate instruments, come to conclusions which stand the test. Electricity always exists in the atmosphere; every molecule of dust and droplet of moisture has its charge. Lightning is a manifestation of enormous charges of opposite kind in relatively close proximity.

Such great charges arise in violent convection as a result of the splitting of overgrown raindrops and the winnowing of the smaller from the larger fragments by the strongly rising air. Lenard found that the spray blown up a waterfall by a breeze is negatively charged, while the large drops rapidly falling to the bottom of the fall are positively charged. The same phenomenon occurs on a grand scale in a thunderstorm.

Raindrops form, always growing larger and larger, but cannot fall against the force of the powerful ascending air currents. Finally, the drops become so large that their limit of cohesion is passed and they break up. The larger drops remain in the levels of the cloud base or descend to earth, while the smaller pass up into the cloudtops. The larger drops carry a positive charge, the smaller ones a negative one. The earth usually is negative. Thus we have a mass of positively charged substance between two masses negatively charged. These charges become more and more powerful, and finally the difference in potential becomes so great that a discharge occurs, from cloud to cloud or cloud to earth. The length of the flash from cloud to earth is usually but a fraction of a mile, though sometimes three or four miles, but with short jumps from cloud to cloud the lightning may extend as much as 20 miles.

(Tomorrow: Thunder.)

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